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Revision of the key characters for the *Thricops nigrifrons* species-group (Diptera, Muscidae)

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Abstract

An analysis of key characters for the separation of *Thricops nigrifrons* and *T. longipes* (Diptera, Muscidae) is given. A revised key for *T. nigrifrons* and related species, including two species recently described from the Caucasus, is proposed.

Keywords

Thricops nigrifrons, Thricops longipes, Muscidae, key

Introduction

The *Thricops nigrifrons* species-group is characterized by: long-plumose arista; dark body; holoptic head in male; absence of apical spur on *t3* and of apical spurs on *t1* in males; *t2* without *pv* or *v* seta(e); lower margin of face not projecting; 4 postsutural *dc*; unmodified fore tarsomeres in male; mid tarsomeres 3–4 each with a row of pale *pv* setulae in male (except *T. dawkinsi*); the male terminalia are similar (*T. semicinereus* - type).

Thricops nigrifrons (Robineau-Desvoidy, 1830) and *T. longipes* (Zetterstedt, 1845) are widespread in the Palearctic region. Nevertheless Hennig (1962), d'Assis-Fonseca (1968), Gregor et al. (2002) and Savage (2003) have given different and often contradictory recommendations on how to separate these species. Recently two new related species have been described from the Russian Caucasus, *T. tomkovichi* Vikhrev, 2009 and *T. dawkinsi* Vikhrev, 2009 (Vikhrev and Sorokina 2009), and this has necessitated a revision of the characters for the separation of *T. nigrifrons* and *T. longipes*.

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The examined material is restricted to Eastern Europe, Transcaucasian region and Siberia, and do not include specimens collected in Western Europe. However, the proposed key characters are expected to be suitable for west-european specimens as well, because there is no gap in natural habitats of *nigrifrons* and *longipes* in Europe. Another reason is the fact that d'Assis-Fonseca (1968) came to the same main conclusions based on the investigation of the material from British Islands.

Material and methods

This analysis is based on the following material:

Thricops dawkinsi Vikhrev, 2009 – 23 ♂♂ and ♀♀. **Russia:** Karachay-Cherkessia, Krasnodar, North Ossetia. Holotype in Zoological Museum of Moscow University, Moscow, (ZMMU), paratypes in ZMMU, Zoological Institute, St. Petersburg (ZIN), and the Natural History Museum, London (BMNH).

Thricops longipes (Zetterstedt, 1845) – 140 ♂♂ and ♀♀. **Estonia. Russia (European)**: Arkhangelsk, Chelyabinsk, Karachay-Cherkessia, Karelia, Komi, Krasnodar, Moscow, Murmansk, Novgorod, St-Petersburg, Ulyanovsk. **Russia (Asian)**: Altai Rep (=Gorno-Altai), Khanty-Mansi, Krasnoyarsk, Novosibirsk, Tomsk, Yamalo-Nenets (ZMMU and ZIN).

Thricops nigrifrons (Robineau-Desvoidy 1830) – 150 ♂♂ and ♀♀. **Estonia. Turkey:** Bolu prov. **Russia (European):** Chelyabinsk, Moscow, St Petersburg, Vladimir, Yaroslavl. **Russia (Asian):** Krasnoyarsk, Novosibirsk, Tomsk (ZMMU and ZIN).

Thricops tomkovichi Vikhrev, 2009 – 62 ♂♂ and ♀♀. **Russia:** Karachay-Cherkessia, Krasnodar. Holotype in (ZMMU), paratypes in ZMMU, ZIN and BMNH.

Morphological structures are abbreviated as: *f1*, *t1*, *f2*, *t2*, *f3*, *t3* = fore, mid, hind, femur or tibia; *ac* = acrostichal setae; *dc* = dorsocentral setae; *a*, *p*, *d*, *v* = anterior, posterior, dorsal, ventral seta(e).

Notes on the identification of *T. nigrifrons* and *T. longipes*

On several occasions colleagues have expressed doubts that *T. nigrifrons* could be reliably separated from *T. longipes*. I have shared these doubts too, but currently I am convinced that a reliable (and rather easy) separation is possible. Let us first consider the identification characters proposed by Hennig (1962), d'Assis-Fonseca (1968), Gregor et al. (2002) and Savage (2003).

1 The longest aristal hairs distinctly longer than width of postpedicel ....***nigrifrons***

– The longest aristal hairs slightly longer than width of postpedicel.... ***longipes***

This character was used as the main one by all the cited authors except for Gregor et al. (2002), although the estimation of length and wording differ.

I agree that the aristal hairs are somewhat longer in *nigrifrons*, but I disagree with using this as the main character: the difference is very fine and the character is variable, with overlapping taking place. Gregor et al. (2002) gave the following measurements: *nigrifrons* – longest aristal hairs 1.05–1.30 times as long as width of postpedicel; *longipes* – 0,85–1.15 times. Instead of the length of aristal hairs Gregor et al. (2002) proposed the following wording:

– Female: long aristal hairs reaching apical third of arista ..... ***nigrifrons***
– Female: long aristal hairs not reaching apical third of arista..... ***longipes***
I have not found this alternative to be more reliable or easier in use than the previous one.

2 Male: upper frons with several proclinate setulae..... ***nigrifrons***
– Male: upper frons with all setulae reclinate..... ***longipes***
First proposed by Hennig (1962), used by Gregor et al. (2002) as the only character for males, used as the main character by Savage (2003). I agree with this character, but these upper frontal setulae are fine and often partly or even completely broken, especially in specimens mounted from alcohol.

3 Male with *p* and *v* setulose hairs on basal half of *f3* hardly longer than depth of femur..... ***nigrifrons***
– Male with *p* and *v* setulose hairs on basal half of *f3* quite twice as long as depth of femur..... ***longipes***
Used by d'Assis-Fonseca (1968), but the other authors excluded this character from their keys. According to the descriptions given by Savage (2003): in *longipes* "*f3* … *p* and *v* surfaces covered with long hairs, longer than depth of femur"; in *nigrifrons* "*f3* … *p* and *v* surfaces covered with setae of variable length, as long to much longer than depth of femur". I suppose that the source of the misunderstanding is that the fine hairs on the *p* and *v* surface of *f3* are not homogeneous. In *longipes*, these hairs really are evenly long, at least twice as long as femoral width, but in *nigrifrons* the hairs on the *p* surface are rather long, usually about 1–1.5 times as long as femoral width, but on the *v* surface they are short, especially in basal half of femur where the hairs are 0.5–1 times as long as femoral width. Thus, the fine hairs on *f3* are distinctly longer in *longipes* than in *nigrifrons*, but the difference is the most obvious in a comparison of the *v* hairs in the basal half of *f3*, for which the hind femur needs only to be observed in lateral view. Among about 150 male specimens examined by me, this character was always reliable and correlated with other characters. No specimens with an intermediate development of *f3* setulae were found.

4 Male *t3* with *pv* present in apical 1/2 ..... ***nigrifrons***
– Male *t3* with *pv* present in apical 2/3 ..... ***longipes***

Proposed by Hennig (1962), but excluded by later authors. I agree with the exclusion of this variable character.

5 Male notopleuron bare..... ***nigrifrons***
– Male notopleuron with a few setulae..... ***longipes***
Proposed by Savage (2003). In fact the notopleuron is setulose on the anterior part in both species. The notopleuron on the surface between the anterior and posterior setae is almost always bare in *nigrifrons* and usually setulose in *longipes*, but bare in a quarter of the examined specimens. This may be used as an additional character only.

6 Male: posterior part of scutum in posterior view densely dusted, without median vitta, with a pair of subshining narrow submedian vittae laterad to *dc* rows..... ***nigrifrons***
– Male: posterior part of scutum in posterior view mostly shining black, with a wide black median vitta ..... ***longipes***
Proposed by Vikhrev and Sorokina (2009), this character separates all examined specimens.

7 Male abdomen with the median vitta on tergite 3 inconspicuous... ***nigrifrons***
– Male abdomen with a conspicuous black median vitta on tergite 3 ... ***longipes***
Proposed by Vikhrev and Sorokina (2009). The trace of a narrow and less dusted median vitta may be present in *nigrifrons*, but otherwise this character separates all examined specimens.

8 Male body length usually 7–7.5 mm, rarely 6–8 mm..... ***nigrifrons***
– Male body length usually 8.5–9 mm, rarely 6.5–9.5 mm..... ***longipes***
– Female body length usually 6.5–7.5 mm..... ***nigrifrons***
– Female body length usually 7.5–9 mm..... ***longipes***
In spite of rare cases of overlapping, this character is at least as reliable as, and much easier to use than the width of the aristal hairs. The body size difference was also mentioned by Hennig (1962) and Savage (2003). It should be noted that this character works for the forest zone where both species are present, but not for the extreme northern populations of *longipes* from the tundra zone, where *nigrifons* has not been recorded. Specimens collected near Vorkuta (67.5°N) have a body size 6–8 mm only.

9 Female: postsutural part of scutum in posterior view with the median vitta indistinct, or if more or less distinct then narrow, widened only posteriorly .
..... ***nigrifrons***
– Female: postsutural part of scutum in posterior view with the undusted median vitta distinct, uniformly wide throughout, occupying all the area between acrostichal rows..... ***longipes***

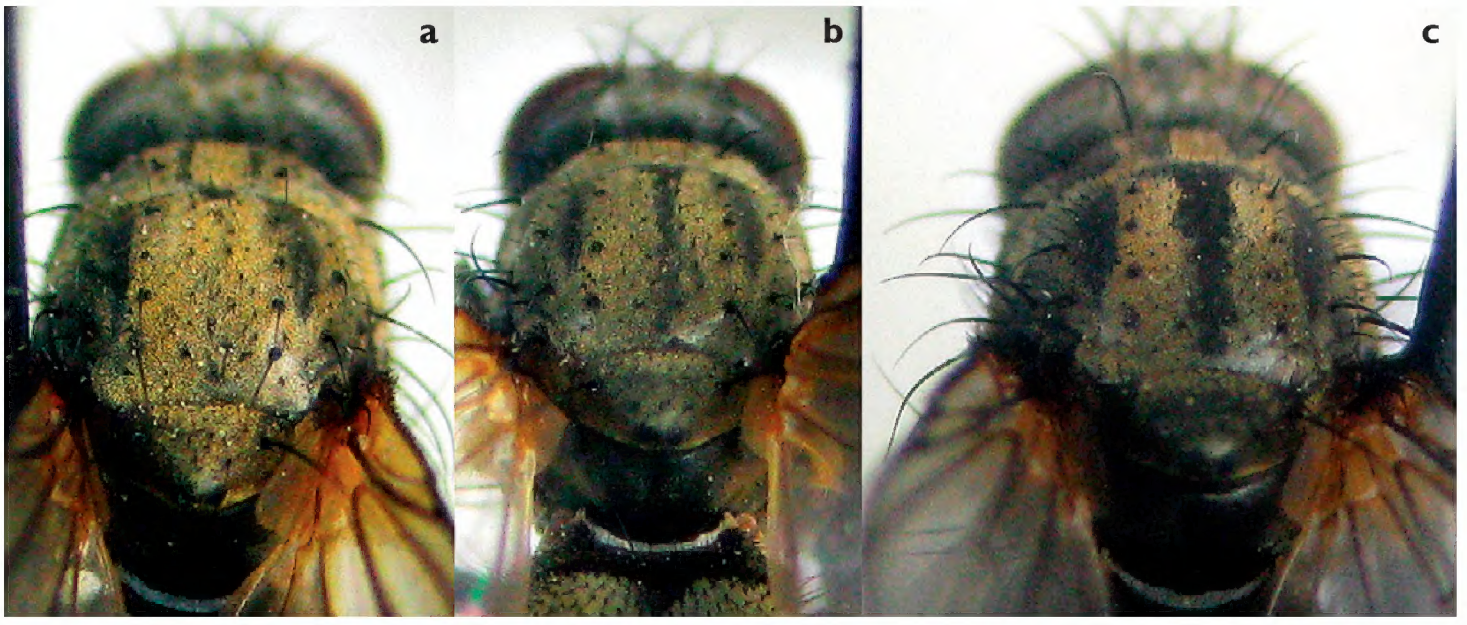

Figure 1. Female scutum in posterior view. **a** *nigrifrons* without median vitta **b** *nigrifrons* with narrow median vitta **c** *longipes*.

Proposed by d'Assis-Fonseca (1968), but with a misprint, so the indistinct vitta was wrongly ascribed to *longipes* and the distinct one to *nigrifrons*. Probably because of this, no one else has drawn attention to this reliable character, which separates all the females I have examined (Fig. 1).

10 Female abdomen with the median stripe narrow, often absent..... ***nigrifrons***

– Female abdomen with a broad median stripe ..... ***longipes***

Again proposed by d'Assis-Fonseca (1968), and again with the characters for *longipes* and *nigrifrons* transposed. Usually present in *longipes*, present or absent in *nigrifrons*. I think it is better to exclude this character.

11 Female: *t3* with only 2 *ad* setae ..... ***nigrifrons***

– Female: *t3* with 3–4 *ad* setae ..... ***longipes***

Used by Hennig (1962) and Savage (2003). Correct in the vast majority of specimens.

12 Female: dusting on thorax and abdomen yellow with a slight brown tint ..... ***nigrifrons***

– Female: dusting on thorax and abdomen grey with a slight yellow tint..... ***longipes***

Proposed by Savage (2003). I agree that usually *nigrifrons* has more yellowish dusting while *longipes* is more greyish, but the reverse situation may also occur. Personally I find this character difficult to use and prefer not to include it in the key.

Distribution. The distribution of these species in mountain areas seems sporadic and there aren't enough reliable records. In the Austrian Alps, in the Oetz Valley, both species overlap at about 1500 m asl. Below this level, in the coniferous and broad-leaf for-

est zone, *nigrifrons* is found; above it, in the upper forest zone and above the tree-line, only *longipes* is found (A.C. Pont, pers. comm.). In the Russian Caucasus (Krasnodarsky Kray and Karachay-Cherkessia) *longipes* is found at the altitudes 1800–2500 m asl., while *nigrifrons* is not found. In the mountain area in Turkey, Bolu prov., 40.6N 31.8E *nigrifrons* is found at the altitudes 1450–1950 m asl., while *longipes* is not found. In European Russia *nigrifrons* is common in the area between Moscow and St. Petersburg (55–60°N), but absent or at least rare in Karelia at 65°N. The southern border of distribution of *longipes* seems to be the northern part of Moscow region (56°N), it is common in the northern coniferous forest zone (taiga) and is still the dominant species in the tundra around Vorkuta (67.5°N). In Abisko National Park (North Sweden, 68°N), with birch forest and mountain tundra (A.C. Pont, pers. comm.) and in birch-willow forest in Murmansk (69°N) only *longipes* was found.

Key for the *Thricops nigrifrons* species-group

Males

1 *f2* with a comb of 3–4 long and strong setae on *p-pv* surface at base and the fine setae in *av* and *pv* rows 1.5–2 times as long as *f2* width. Legs at least partly yellowish (tibiae) or both tibiae and femora yellow. *t3* with a comb of ventral preapicals consisting of 3–4 long curved setae. Caucasus **2**

– *f2* without such a comb of setae on *p-pv* surface at base and the setae in *pv* and *av* rows short, at most as long as femoral width. Legs entirely black. *t3* with 1–2 shorter ventral preapical setae. Palearctic, including Transcaucasian region **3**

2 Femora black, tibiae more or less darkened basally. Mid tarsomeres 3–4 each with a row of pale *pv* setulae. Fore tarsus on *p*-surface with fine hairs that are 1.5 times as long as tarsal width ..... ***tomkovichi* Vikhrev**

– All femora and tibiae yellow, at most fore femur slightly darkened. Mid tarsomeres 3–4 each with the row of pale *pv* setulae reduced. Fore tarsus with the *p*-hairs not longer than tarsal width..... ***dawkinsi* Vikhrev**

3 In lateral view, *f3* on basal half with fine hairs on *v* surface at most as long as femoral width, much shorter than the strong *av* setae (the hairs on *p* surface at most 1.5 times as long as femoral width). In posterior view postsutural part of scutum densely yellowish-grey dusted without a median vitta between acrostichals (a pair of vittae present laterad to *dc* rows). Abdomen with the median vitta on tergite 3 inconspicuous, at most a narrow trace of a vitta present. Frons with both pro- and reclinate setulae on upper half. Secondary characters: body length usually 7–7.5 mm, rarely 6–8 mm; ground setulae absent between the two notopleural bristles, longest aristal hairs 1.05–1.30 times as long as width of postpedicel..... ***nigrifrons* (Robineau-Desvoidy)**

– In lateral view, *f3* on basal half with fine hairs on *v* surface about twice as long as femoral width, about as long as the strong *av* setae (these hairs on *p*

surface at least twice as long as femoral width). In posterior view, postsutural part of scutum subshining black with only thin greyish dusting, consisting of two vittae restricted to areas between *ac* rows and slightly beyond *dc* rows, median vitta between *ac* rows always present. Abdomen with a black subshining median vitta on tergite 3 wide and distinct on at least anterior 2/3 of tergite. Frons with all setulae on upper half reclinate. Secondary characters: body length usually 8.5–9 mm, rarely 7.5–9.5 mm, ground setulae usually (in 75% specimens) present between the two notopleural bristles, longest aristal hairs 0.85–1.15 times as long as width of postpedicel ..... ***longipes* (Zetterstedt)**

Females

1 Legs entirely black. Palearctic, including Transcaucasian region..... **2**

– Legs partly or entirely yellow. Caucasus **3**

2 Postsutural part of scutum in posterior view with the median vitta indistinct (Fig. 1a), or if more or less distinct then narrow, sometimes slightly widened posteriorly (Fig. 1b). *t3* with only 2 *ad* setae. Longest aristal hairs 1.05–1.30 times as long as width of postpedicel. Body length usually 6.5–7.5 mm..... ***nigrifrons* (Robineau-Desvoidy)**

– Postsutural part of scutum in posterior view with the undusted median vitta distinct, uniformly wide throughout, occupying all the area between *ac* rows (Fig. 1c). *t3* with 3–4 *ad* setae, the additional seta(e) often short. Longest aristal hairs 0.85–1.15 times as long as width of postpedicel. Body length usually 7.5–9 mm ..... ***longipes* (Zetterstedt)**

3 Femora black, tibiae darkened basally ..... ***tomkovichi* Vikhrev**

– Femora and tibiae yellow ..... ***dawkinsi* Vikhrev**

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